

The flora of the Watchung Mountains*

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PART II—THE FLORA

The Watchung Mountains, lying wholly within the Piedmont phytogeographic province, whose geologic history we have just reviewed, have a native flora which is, on the whole, quite characteristic of this province, although doubtless the close proximity of four other important phytogeographic provinces, viz., the Coastal Plain, the New England, the Appalachian Valley, and the Appalachian Plateaus, has aided materially in building up the remarkably rich flora which is to be found in these hills. Far greater contributions, however, have come due to the proximity of the area to the port of New York City, through which so many scores of foreign plants have entered.

Very representative of the region is the flora of that part of the Watchung Mountains at the town of Watchung itself, and in its immediate vicinity. Here, in a total area of less than 25 square miles, the present writer has recorded no less than 1355 different species and varieties of wild plants, fully 85 per cent of which can be found in an area of 5 square miles.¹ Although he has worked in his spare time for the past 9 years on the compilation of a complete list of the wild flora of this region, the writer is nevertheless convinced that the recorded list is still far from complete. If the cryptogams of the region could be as thoroughly collected and as accurately identified as have the phanerogams, the total for even this very small portion of the area under discussion would most certainly mount to well above two thousand species and varieties. Among the botanists who have collected in the region should be mentioned William Henry Leggett, Ezra Brainerd, Frank Tweedy, Nathaniel Lord Britton, Per Axel Rydberg, George Valentine Nash, Kenneth Kent

* A correction should be made in part I of this article, in the May-June number of *Torreya*: on page 61, beginning on line 10 the sentence should read: "and planed down in the Cretaceous and Tertiary Periods (since late Cretaceous deposits are overlain by Tertiary in southern New Jersey)."

¹ The observed flora of Watchung, N. J., and its immediate vicinity. Ed. 3. The Elsinore Press, Watchung, N. J. 1934. Also supplements.

Mackenzie, Mintin Asbury Chrysler, Waldron de Witt Miller, Percy Wilson, Norman Taylor, Gladys Pomeroy Anderson, and Edward J. Alexander. The collections of Mackenzie, Miller, and Tweedy are probably the most extensive made in the region before the present survey was begun.

In the Watchung area, out of the total of 1355 species and varieties recorded, 1105 (or 81 per cent) are native—the remaining 250 (or 19 per cent) are introduced. Some of these foreign introductions have become very widely naturalized and constitute what may in many cases be designated as pernicious weeds. Others have become only sparingly naturalized; a few have been found only as waifs. Species existing in the area only in cultivation are, of course, not here considered. Of the 250 introductions to the region, 164 are indigenous to Europe, 12 to Eurasia, 26 to Asia, 1 to the Old World tropics in general, 14 to tropical America, and 23 to other portions of North America. In addition, 10 species and varieties usually ascribed to horticultural origin have escaped from cultivation and have become more or less naturalized.

Some of the more interesting naturalized species of the region have been described in a previous article.² *Elaeagnus umbellata*, a handsome Japanese shrub with silvery foliage, and *Berberis Thunbergii*, the common barberry hedge, also from Japan, are widespread through the fields, along the streams and throughout the woods on both the First and Second ridges. Their distribution is doubtless explained by the fact that their fruits are fleshy and highly relished by birds. *Azalea japonica* would spread through the open fields far more rapidly even than it has, were it not so relentlessly hunted and uprooted. *Lonicera Morrowi*, *Symphoricarpos albus* var. *laevigatus*, *Monarda didyma*, *Symphytum officinalis*, *Phlox paniculata*, *Convolvulus japonicus* and *C. arvensis*, *Vinca minor*, *Ligustrum obtusifolium*, *Ailanthus altissima*, *Amygdalus persica*, *Malus sylvestris*, *Pyrus communis*, *Chaenomeles lagenaria*, *Spiraea Billiardii* and *S. prunifolia* var. *plena*, *Poterium Sanguisorba*, two varieties of *Deutzia scabra*, *Cleome spinosa*, *Chelidonium majus*, *Pleuropterus cuspidatus*, *Aristolochia macrophylla*, two species of *Narcissus*, *Asparagus officinalis*, *Ornithogalum umbellatum*, and four kinds of *Hemerocallis* are other noteworthy introduced members of the flora.

² Torrey *31*: 29–36. 1931.

The European *Sedum triphyllum* is very common, as also are *Allium vineale*, *Salix alba*, *S. fragilis*, and *S. purpurea*, *Humulus Lupulus*, *Broussonetia papyrifera*, *Bilderdykia Convolvulus*, *Ambrina ambrosioides*, *Mollugo verticillata*, *Dianthus Armeria*, *Lychnis alba*, *Silene latifolia*, *Ranunculus acris* and *R. bulbosus*, *Campe verna*, *Sisymbrium Nasturtium-aquaticum*, *Norta altissima*, *Prunus avium*, *Abutilon Theophrasti*, *Pastinaca sativa* var. *sylvestris*, *Lysimachia Nummularia*, both the white- and the yellow-flowered *Verbascum Blattaria*, *V. Thapsus*, and *Lonicera japonica*. Eight European mints are common—*Lamium purpureum*, *Glecoma hederacea*, *Leonurus cardiaca*, *Mentha gentilis*, *M. piperita*, *M. spicata*, *Nepeta Cataria*, and *Prunella vulgaris*. *Leucanthemum vulgare*, from Europe, is one of the most conspicuous summer flowers in open fields and along roadsides, and *Galinsoga ciliata*, from South America, together with *Portulaca oleracea*, from Europe, are among the most persistent and pernicious of garden weeds. Other common introduced composites are *Arctium minus*, *Chamomilla suaveolens*, *Cirsium arvense* and *C. lanceolatum*, *Senecio sylvaticus* and *S. vulgaris*, *Tanacetum vulgare*, *Tussilago Farfara*, blue and white chicory, dandelion; and two forms of *Lactuca virosa*. Of the 8 species of hawkweed, 4 are native and 4 European. *Hieracium murorum* is found in one large colony in the area—one of the half dozen records of this species for America.

Without doubt the rarest and most interesting of all the native plants of the region is *Obolaria virginica*, a saprophytic member of the gentian family, which has been found in sizable colonies in many localities on the Second Watchung. Orchids, too, are well represented. Thus far 17 species, representing 11 genera of this family, have been found in the vicinity of Watchung, including *Blephariglottis grandiflora*, *B. lacera*, *B. psycodes*, *Corallorhiza maculata* and *C. odontorhiza*, *Goodyera repens* var. *ophioides*, *Isotria verticillata*, *Limodorum tuberosum*, *Liparis liliifolia*, *Galeorchis spectabilis*, *Malaxis unifolia*, and *Perularia flava*. Four species of ladies-tresses (*Spiranthes*) are there found, and the moccasin-flower (*Fissipes acaulis*) is rather abundant in some localities. None of these orchids, however, can justly be designated as common and should therefore be afforded all the protection and conservation that it is possible to give them. Other species, common in the region up to a

very few years ago, must now also be afforded protection, such as the cardinal-flower (*Lobelia cardinalis*), the butterfly-weed (*Asclepias tuberosa*), the great blue lobelia (*Lobelia siphilitica*) and the pale spiked lobelia (*L. spicata*), the golden-club (*Orontium aquaticum*), the yellow field lily (*Lilium canadense*) and the wood lily (*L. philadelphicum*), prince's-pine (*Chimaphila umbellata*) and spotted wintergreen (*C. maculata*), pinxter-flower (*Azalea nudiflora*), wild columbine (*Aquilegia canadensis*), trailing arbutus (*Epigaea repens*), fringed gentian (*Anthopogon crinitum*), closed gentian (*Dasystephana Andrewsii*), rose-pink (*Sabbatia angularis*), and Virginia bluebells (*Mertensia virginica*). Four other species, formerly very abundant in the region, are being relentlessly persecuted by unthinking persons who yearly destroy hundreds of the plants and thus year by year bring the species nearer to extermination. These species are the trailing Christmas-green (*Lycopodium flabelliforme*), the bayberry (*Certhamnus carolinensis*), the climbing bittersweet (*Celastrus scandens*), and the flowering-dogwood (*Benthamidia florida*).

In addition to the *Obolaria* mentioned above, 3 other saprophytic phanerogams occur in the area—*Hypopitys americana*, *Monotropa uniflora*, and *Thalesia uniflora*. The Indian paintbrush (*Castilleja coccinea*) is still to be found in some localities and 3 species of gerardia (*Agalinis*) are fairly abundant. The true American ginseng (*Panax quinquefolium*) still occurs in at least one locality, and another rarity is *Ilex bronxensis*. The American bladdernut (*Staphylea trifolia*) occurs in scattered localities, as does also the redbud (*Cercis canadensis*). All the plants mentioned in this and the preceding paragraph deserve conservation, and, indeed, in many cases urgently need our protection. They are the true "vanishing Americans."

Plainfield was for some time the headquarters of Ezra Brainerd who was fascinated by the wealth of wild violets in the Watchung area. No less than 33 distinct species, varieties, and named hybrids have been recorded from the region, including the rare *Viola Bissellii*, *V. conturbata*, *V. columbiana*, *V. erratica*, *V. Malteana*, *V. modica*, *V. Napae*, and *V. ravidia*. The sugar maple (*Acer saccharum*) and the Canada hemlock (*Tsuga americana*) both occur native in Wetumpka Notch and on other portions of the First and Second Watchungs; 11 species of tick-

trefoil (*Desmodium*) have been recorded, and 13 species and 2 hybrids of *Rubus*. *Robinia viscosa* occurs in numerous localities as though native; *Rubacer odoratus* is abundant; and *Crataegus uniflora* quite common. Of the 11 species of willow recorded, at least 5 are native and the rest so widely naturalized as to appear indigenous.

The wide occurrence of the yam-root (*Dioscorea villosa*) in the region comes as rather of a surprise, as does also the abundance of the sweet-gum (*Liquidambar styraciflua*) and of *Achillea asplenifolia*. Other interesting natives are *Celtis crassifolia*, *Asarum reflexum*, *Triosteum aurantiacum* and *T. angustifolium*, *Menispermum canadense*, and *Corydalis flavula*. Nine kinds of *Ranunculus*, 6 of *Rosa*, 5 of *Lespedeza*, 4 of *Xanthoxalis*, 8 of *Asclepias*, 4 of *Cuscuta*, 4 of *Scutellaria*, 5 of *Physalis*, 5 of *Veronica*, 7 of *Galium*, 6 of *Viburnum*, 7 of *Eupatorium*, 5 of *Senecio*, 15 of *Solidago*, and 7 of *Scirpus* occur in the neighborhood of Watchung. The largest genus, however, in this area is *Carex* with 85 recorded species. The lichen *Cladonia* has 32 forms in the area, *Panicum* coming next with 25, and *Aster* taking fourth place with 24. Of ferns and fern-allies there are 32, of grasses 97, of sedges 113, and of composites 132 species and named varieties. Culver's-root (*Veronicastrum virginicum*), milk-purslane (*Chamaesyce maculata*), and two species of yellow false-foxglove (*Aureolaria*) are abundant in many localities, and turtle-head (*Chelone glabra*), monkey-flower (*Mimulus ringens*), and 3 species of forget-me-not (*Myosotis*) may be found in wet places. Ditch-stonecrop (*Penthorum sedoides*), green-milkweed (*Acerates viridiflora*), white baneberry (*Actaea pachypoda*), entchanters'-nightshade (*Circaea latifolia*), and 4 species of loosestrife are abundant. *Azalea prinophylla* occurs sparingly, as do also *Cirsium muticum* and *Pedicularis lanceolata*. Other rarities are *Chamaelirium luteum*, *Melanthium latifolium* and *M. virginicum*, the large-flowered wake-robin (*Trillium grandiflorum*), Indian cucumber-root (*Medeola virginiana*), and carrion-flower (*Nemexia herbacea*). Along watercourses are to be found *Heteranthera reniformis*, *Zosterella dubia*, *Ceratophyllum demersum*, *Utricularia gibba*, lizard's-tail (*Saururus cernuus*), spatterdock (*Nuphar advena*), 2 species of pondweed (*Potamogeton pusillus* and *P. diversifolius*), 2 of bur-reed (*Sparganium androcladum* and *S. eurocarpum*), the common arrowhead (*Sagit-*

taria latifolia), water-plantain (*Alisma subcordatum*), and the ubiquitous *Spirodela polyrhiza* (smallest of all known flowering plants), duckweed (*Lemna*), and cattail (*Typha*). The sweet-flag (*Acorus Calamus*) is very common, and a pinweed (*Lechea Leggettii*) abounds in open woods, while the sticky-flowered *Cuphea petiolata* is widely distributed in dry fields. Two species of yellow false-flax (*Cathartolinum*) and two of partridge-pea (*Chamaecrista*) are common, but the presence of *Plantago halophila*, *Melampyrum lineare*, *Grossularia hirtella*, *Ribes triste*, and *Micranthes pennsylvanica* comes as a surprise. Three species of *Apocynum* often grow almost side by side in Washington Valley, from which locality 84 forms of lichens, 52 species of mosses, 55 agarics, and 13 polypores have also been recorded.

Extremely showy is the tall purple-flowered gayfeather or blazing-star (*Liatris spicata*). Very noteworthy is the presence of the cranberry-bush (*Viburnum trilobum*) and of the purple virgin's bower (*Atragene americana*).

Other plants of the region worthy of mention are the common eastern rush (*Juncus effusus* var. *solutus*), the northern pitcher plant (*Sarracenia purpurea*), the swamp-honeysuckle (*Azalea viscosa*), the round-leaved sundew (*Drosera rotundifolia*), the northern prickly-pear (*Opuntia compressa*), the walking fern (*Camptosorus rhizophyllus*), the northern hornbeam (*Carpinus caroliniana* var. *virginiana*), the common American reed (*Phragmites maximus* var. *Berlandieri*)⁵ and the sassafras (*Sassafras albidum* var. *molle*).

In a future article the author hopes to compare the northern (glaciated) with the southern (unglaciated) portions of the Watchung Mountains and the eastern ridges (First and Second) with the western ones (Third and Fourth).

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⁵ *Phragmites maximus* var. *Berlandieri* (Fourn.) Moldenke, com. nov. *Phragmites Berlandieri* Fourn., Bull. Bot. Soc. France 24: 178. 1877. In regard to the application of this varietal designation to our American reed, see Fernald, *Rhodora* 34: 211 (1932) and in regard to the new specific designation, see E. D. Merrill, *Trans. Am. Philos. Soc. New Ser.* 24²: 79-80 (1935).